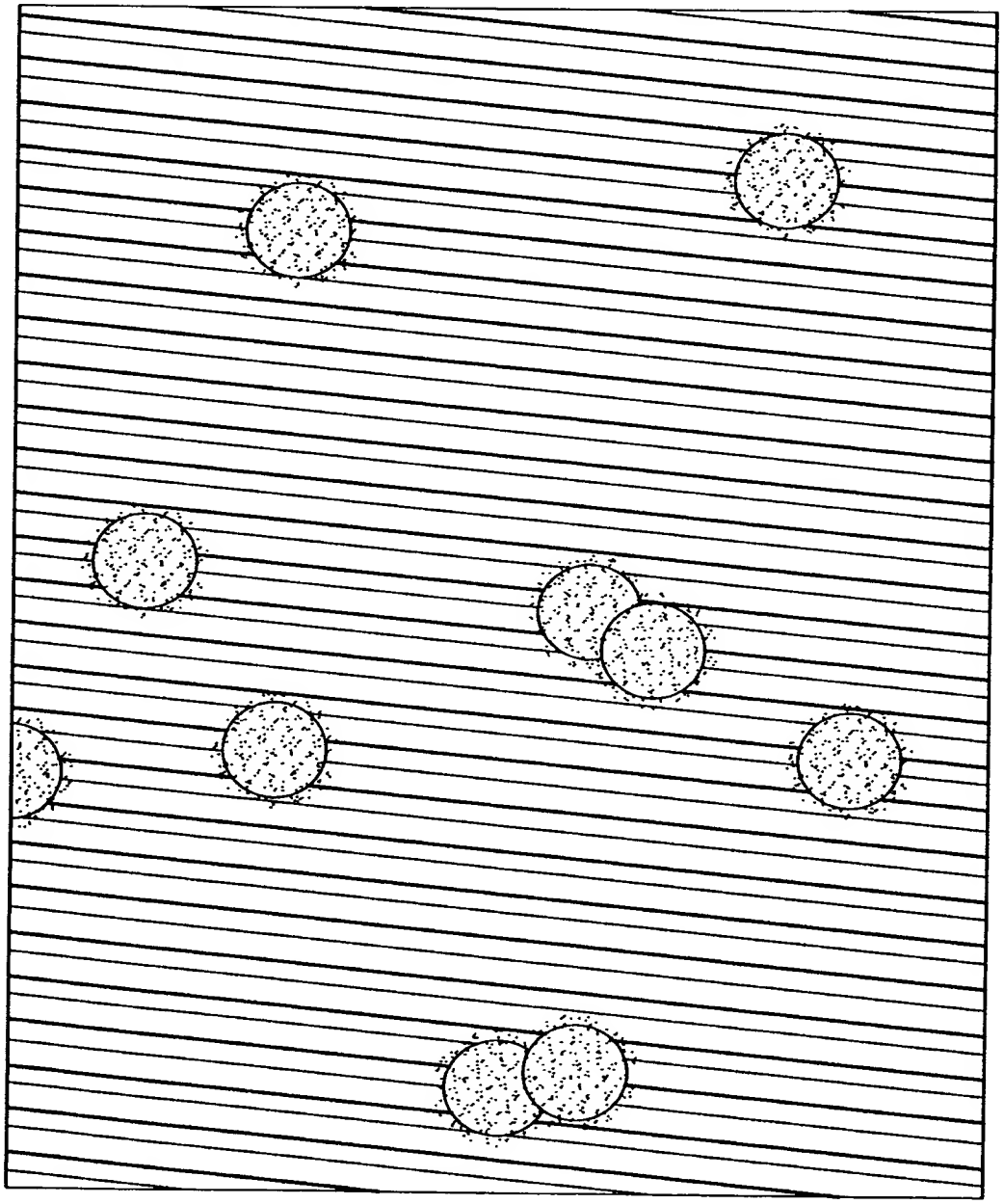


FIG.8

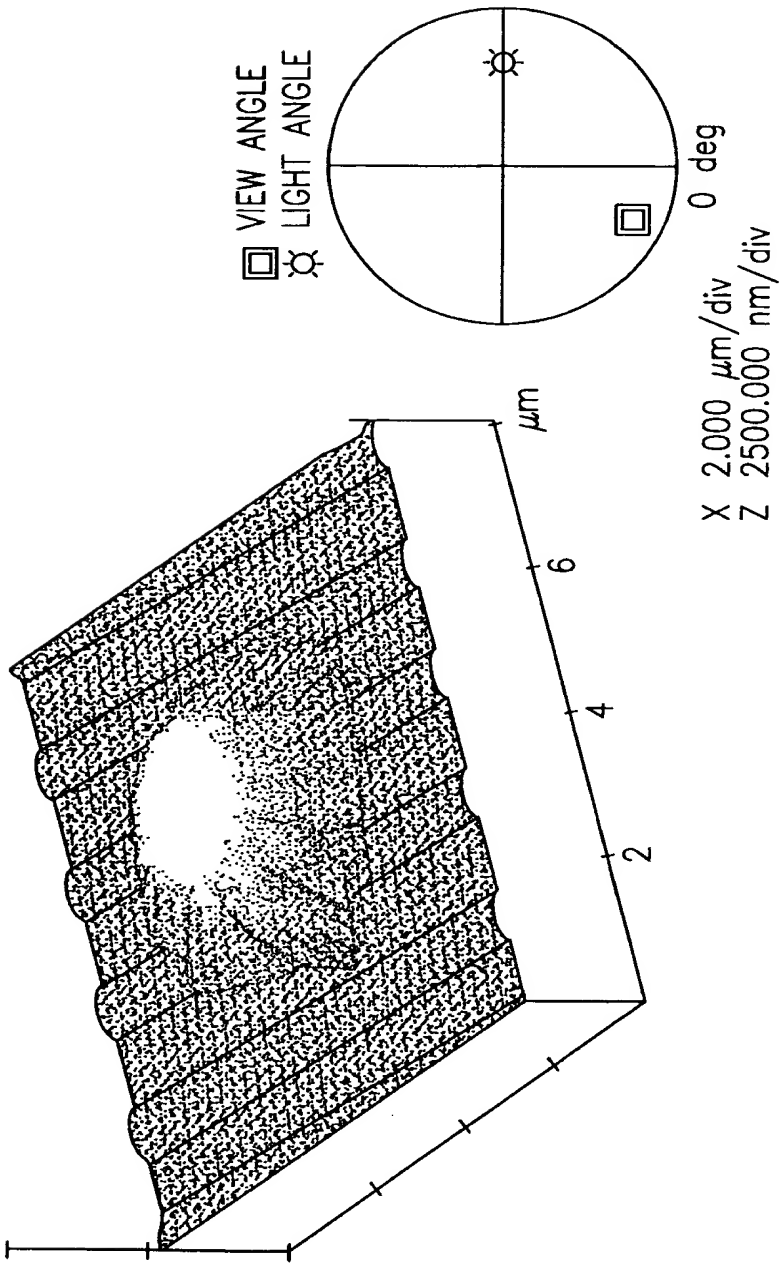

VIEW ANGLE
LIGHT ANGLE
0 deg
X 2.000 µm/div
Z 2500.000 nm/div
µm
6
4
2
Sphere on Wobble Groove

FIG.9

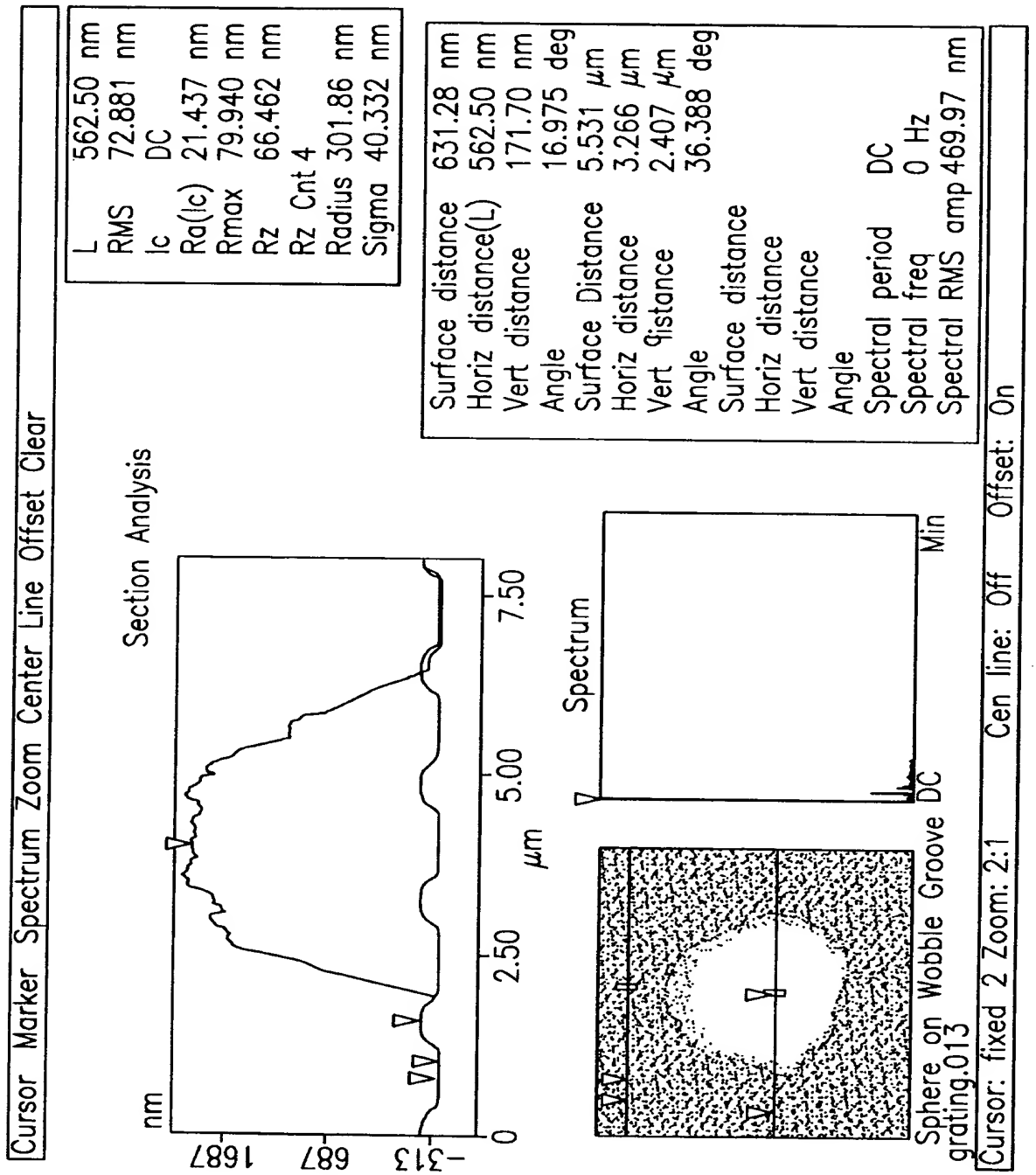

Cursor Marker Spectrum Zoom Center Line Offset Clear
Section Analysis
nm
1687
687
-313
0
2.50
5.00
7.50
μm
L 562.50 nm
RMS 72.881 nm
lc DC
Ra(lc) 21.437 nm
Rmax 79.940 nm
Rz 66.462 nm
Rz Cnt 4
Radius 301.86 nm
Sigma 40.332 nm
Surface distance 631.28 nm
Horiz distance(L) 562.50 nm
Vert distance 171.70 nm
Angle 16.975 deg
Surface Distance 5.531 μm
Horiz distance 3.266 μm
Vert distance 2.407 μm
Angle 36.388 deg
Surface distance
Horiz distance
Vert distance
Angle
Spectral period DC
Spectral freq 0 Hz
Spectral RMS amp 469.97 nm
Spectrum
DC
Min
Sphere on Wobble Groove
grating.013
Cursor: fixed 2 Zoom: 2:1 Cen line: Off Offset: On

FIG.10

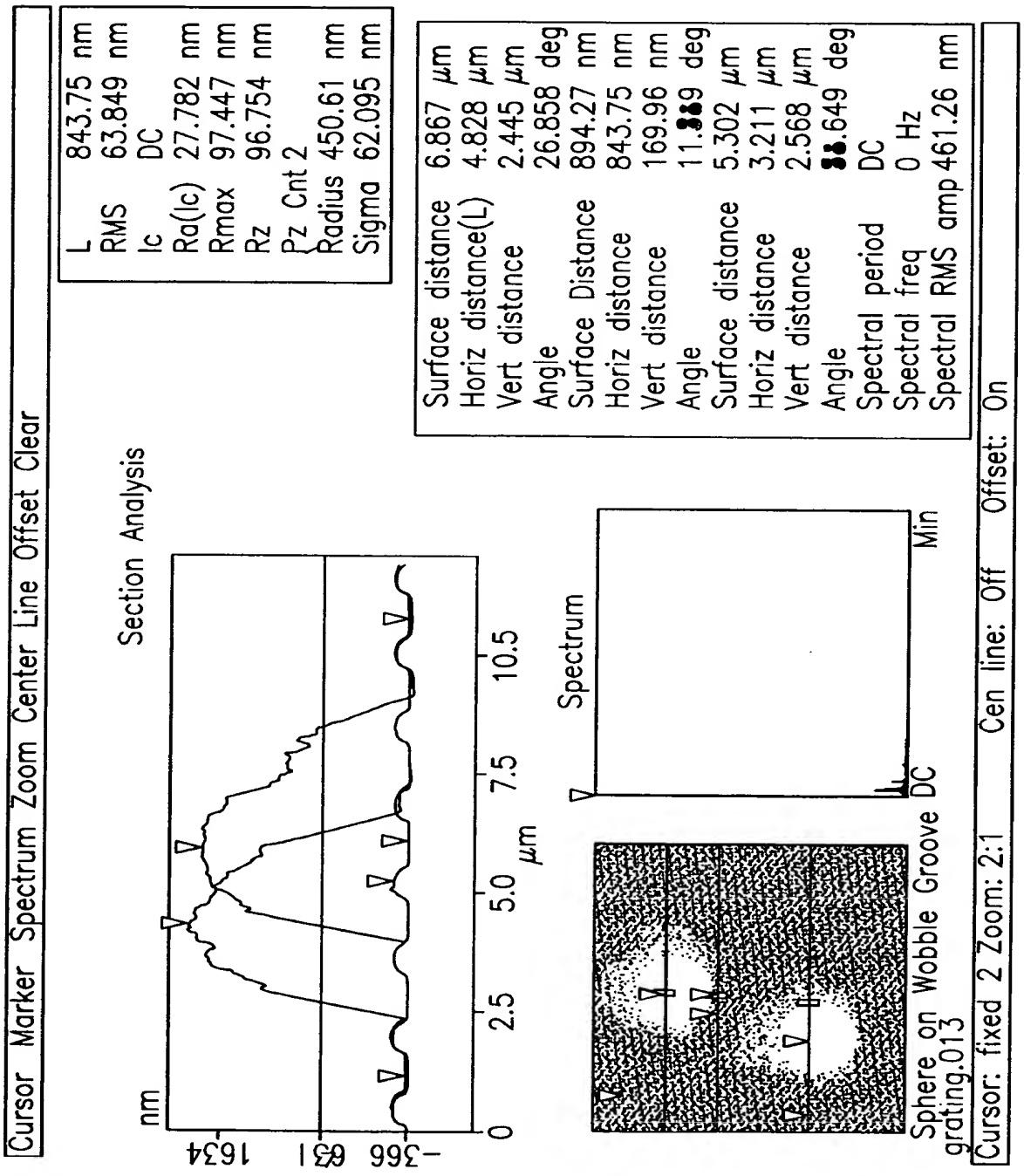

Cursor Marker Spectrum Zoom Center Line Offset Clear
L 843.75 nm
RMS 63.849 nm
lc DC
Ra(lc) 27.782 nm
Rmax 97.447 nm
Rz 96.754 nm
Pz Cnt 2
Radius 450.61 nm
Sigma 62.095 nm
Surface distance 6.867 µm
Horiz distance(L) 4.828 µm
Vert distance 2.445 µm
Angle 26.858 deg
Surface Distance 894.27 nm
Horiz distance 843.75 nm
Vert distance 169.96 nm
Angle 11.889 deg
Surface distance 5.302 µm
Horiz distance 3.211 µm
Vert distance 2.568 µm
Angle 88.649 deg
Spectral period DC
Spectral freq 0 Hz
Spectral RMS amp 461.26 nm
Section Analysis
nm
1634
631
-366
0
2.5
5.0
7.5
10.5
µm
Spectrum
DC
Min
Sphere on Wobble Groove grating.013
Cursor: fixed 2 Zoom: 2:1 Cen line: Off Offset: On

FIG.11

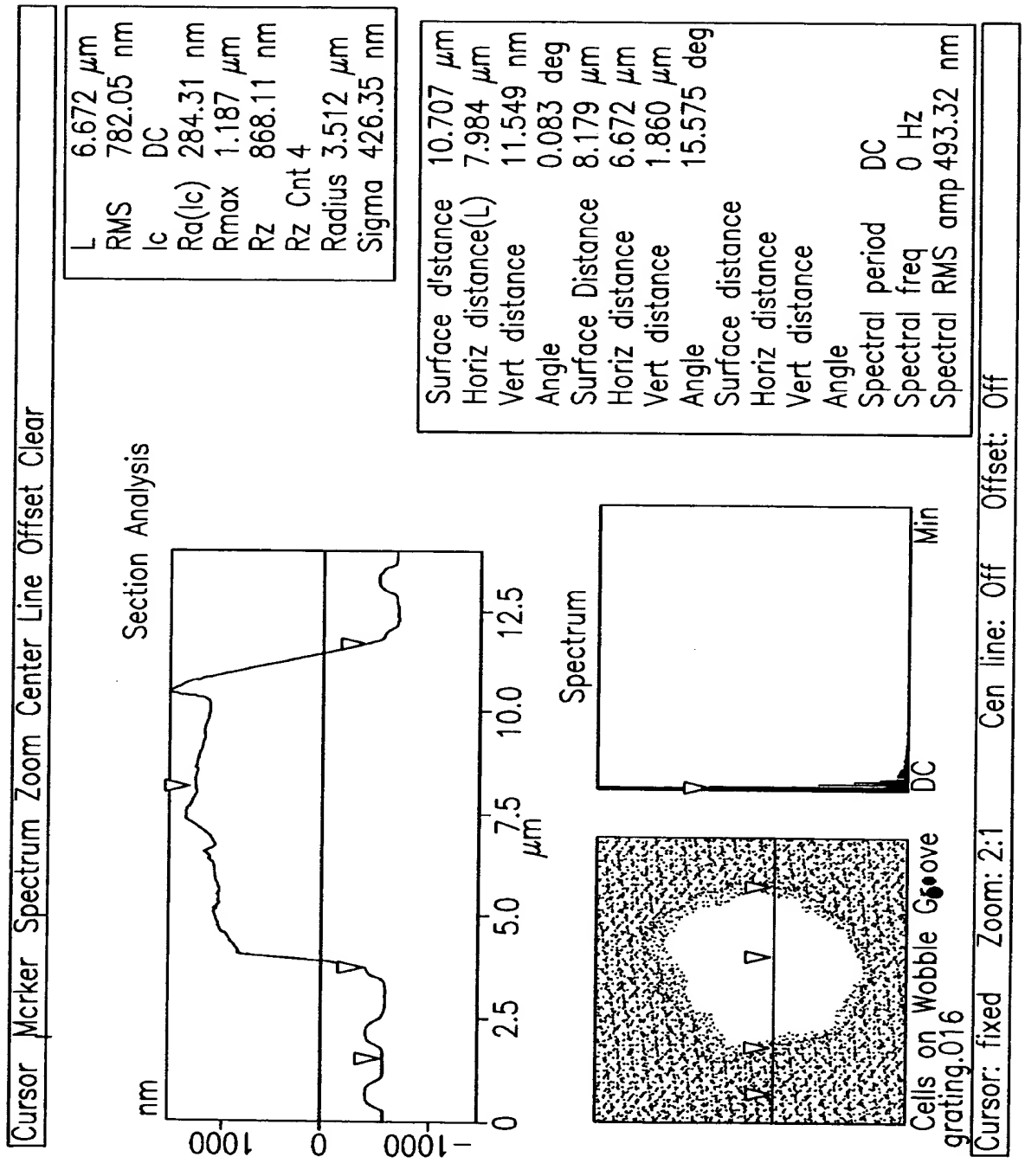

Cursor Mcrker Spectrum Zoom Center Line Offset Clear
L 6.672 µm
RMS 782.05 nm
Ic DC
Ra(Ic) 284.31 nm
Rmax 1.187 µm
Rz 868.11 nm
Rz Cnt 4
Radius 3.512 µm
Sigma 426.35 nm
Surface d'stance 10.707 µm
Horiz distance(L) 7.984 µm
Vert distance 11.549 nm
Angle 0.083 deg
Surface Distance 8.179 µm
Horiz distance 6.672 µm
Vert distance 1.860 µm
Angle 15.575 deg
Surface distance
Horiz distance
Vert distance
Angle
Spectral period DC
Spectral freq 0 Hz
Spectral RMS amp 493.32 nm
Section Analysis
nm
1000
0
-1000
0
2.5
5.0
7.5
10.0
12.5
µm
Spectrum
DC
Min
Cells on Wobble Groove grating.016
Cursor: fixed Zoom: 2:1 Cen line: Off Offset: Off

FIG.12

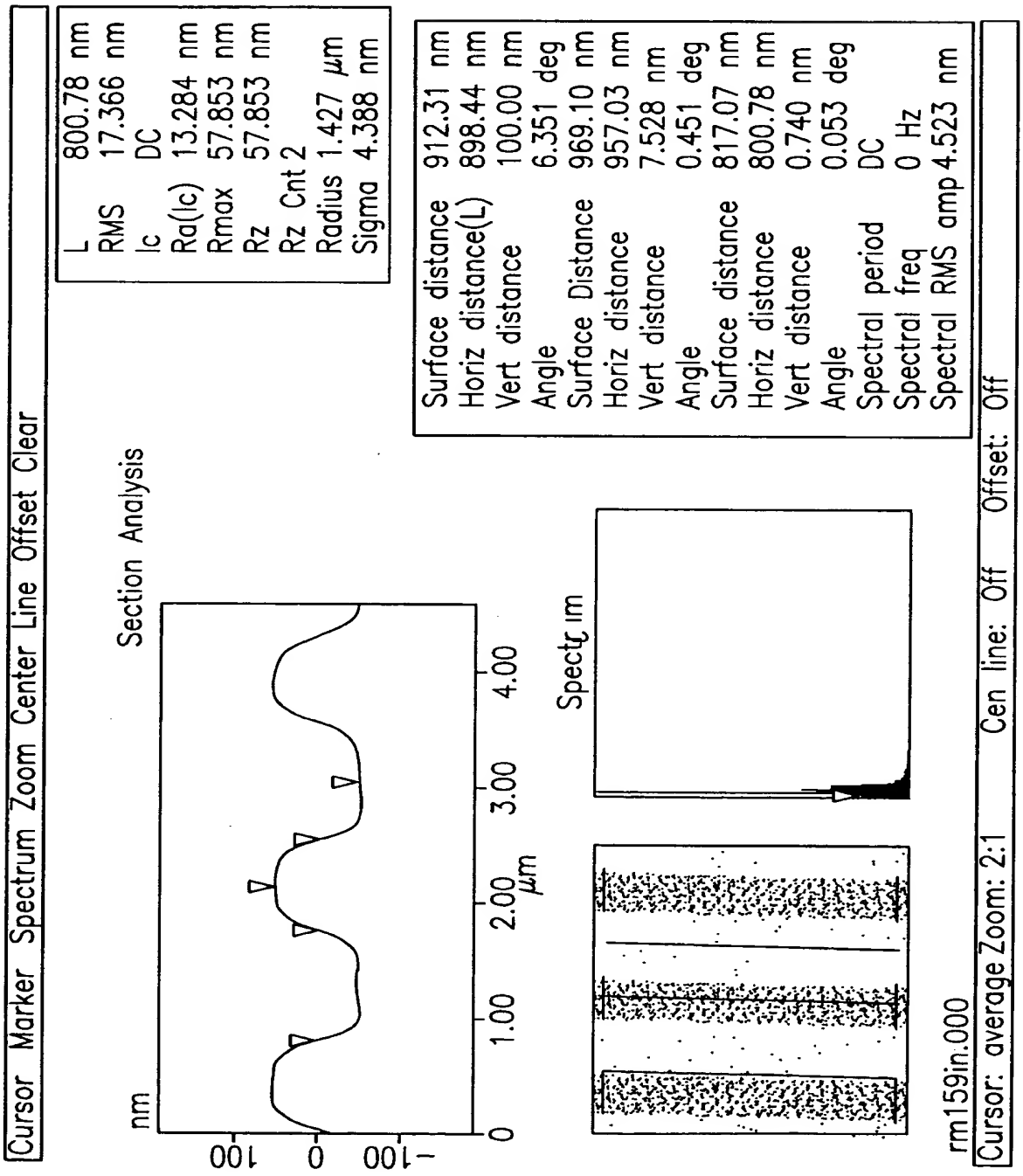
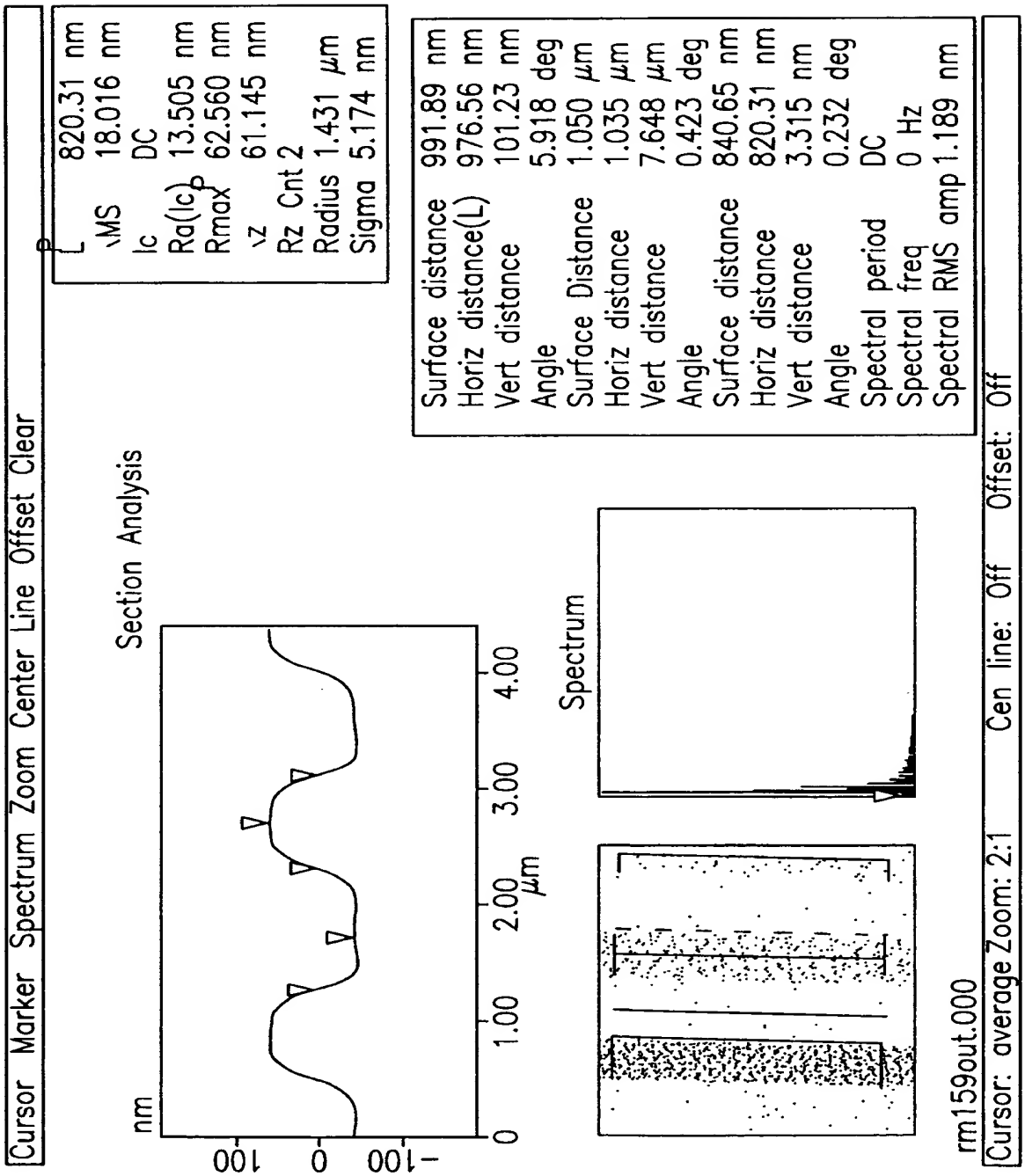

Cursor Marker Spectrum Zoom Center Line Offset Clear
Section Analysis
nm
100
0
-100
0
1.00
2.00
3.00
4.00
μm
Spectrum
L 800.78 nm
RMS 17.366 nm
lc DC
Ra(lc) 13.284 nm
Rmax 57.853 nm
Rz 57.853 nm
Rz Cnt 2
Radius 1.427 μm
Sigma 4.388 nm
Surface distance 912.31 nm
Horiz distance(L) 898.44 nm
Vert distance 100.00 nm
Angle 6.351 deg
Surface Distance 969.10 nm
Horiz distance 957.03 nm
Vert distance 7.528 nm
Angle 0.451 deg
Surface distance 817.07 nm
Horiz distance 800.78 nm
Vert distance 0.740 nm
Angle 0.053 deg
Spectral period DC
Spectral freq 0 Hz
Spectral RMS amp 4.523 nm
rm159in.000
Cursor: average Zoom: 2:1 Cen line: Off Offset: Off

FIG.31

FIG.32


Cursor Marker Spectrum Zoom Center Line Offset Clear
Section Analysis
nm
100
0
-100
0
1.00
2.00
3.00
4.00
μm
Spectrum
L 820.31 nm
λMS 18.016 nm
lc DC
Ra(lc)p 13.505 nm
Rmax 62.560 nm
λz 61.145 nm
Rz Cnt 2
Radius 1.431 μm
Sigma 5.174 nm
Surface distance 991.89 nm
Horiz distance(L) 976.56 nm
Vert distance 101.23 nm
Angle 5.918 deg
Surface Distance 1.050 μm
Horiz distance 1.035 μm
Vert distance 7.648 μm
Angle 0.423 deg
Surface distance 840.65 nm
Horiz distance 820.31 nm
Vert distance 3.315 nm
Angle 0.232 deg
Spectral period DC
Spectral freq 0 Hz
Spectral RMS amp 1.189 nm
rm159out.000
Cursor: average Zoom: 2:1 Cen line: Off Offset: Off

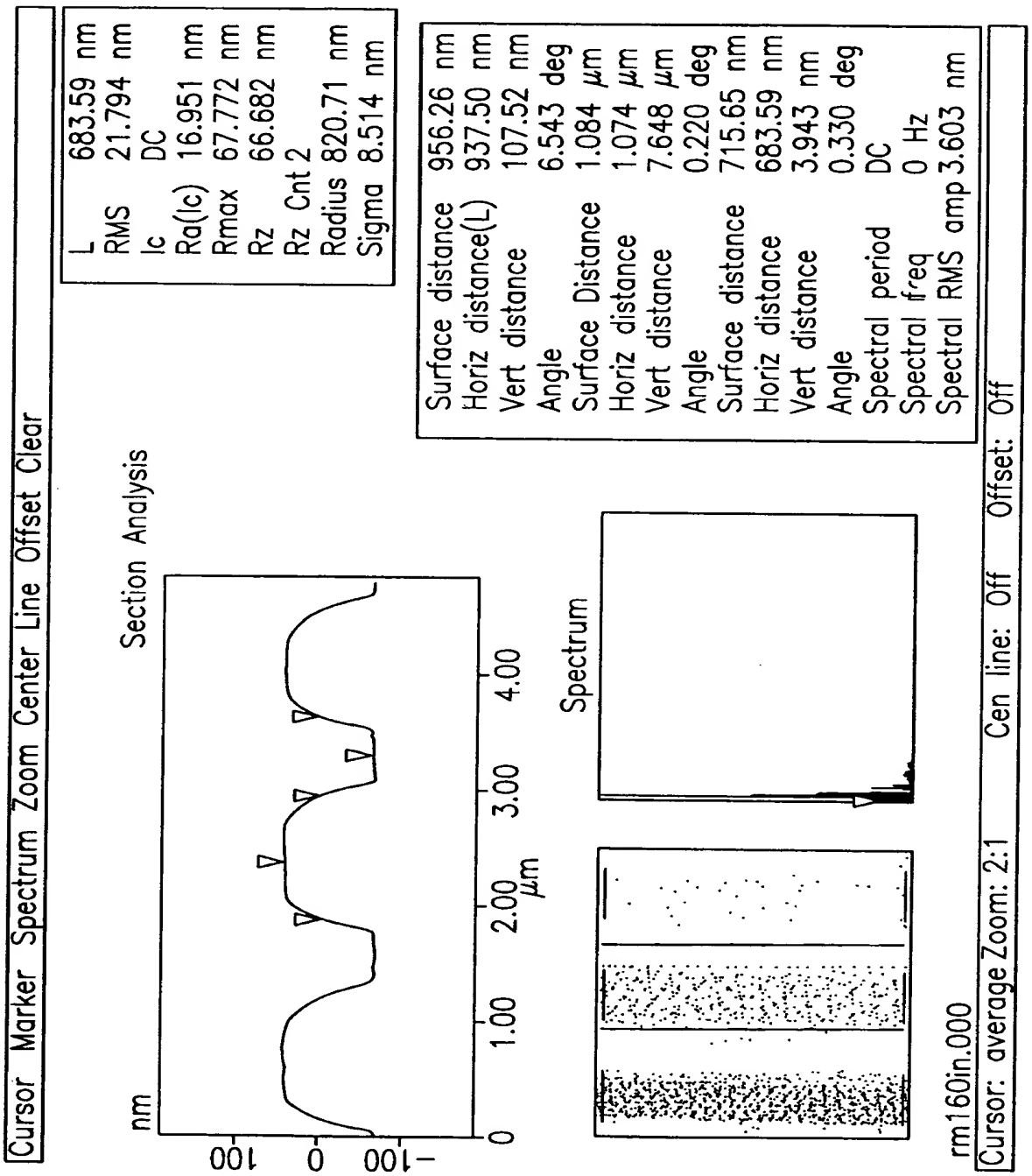
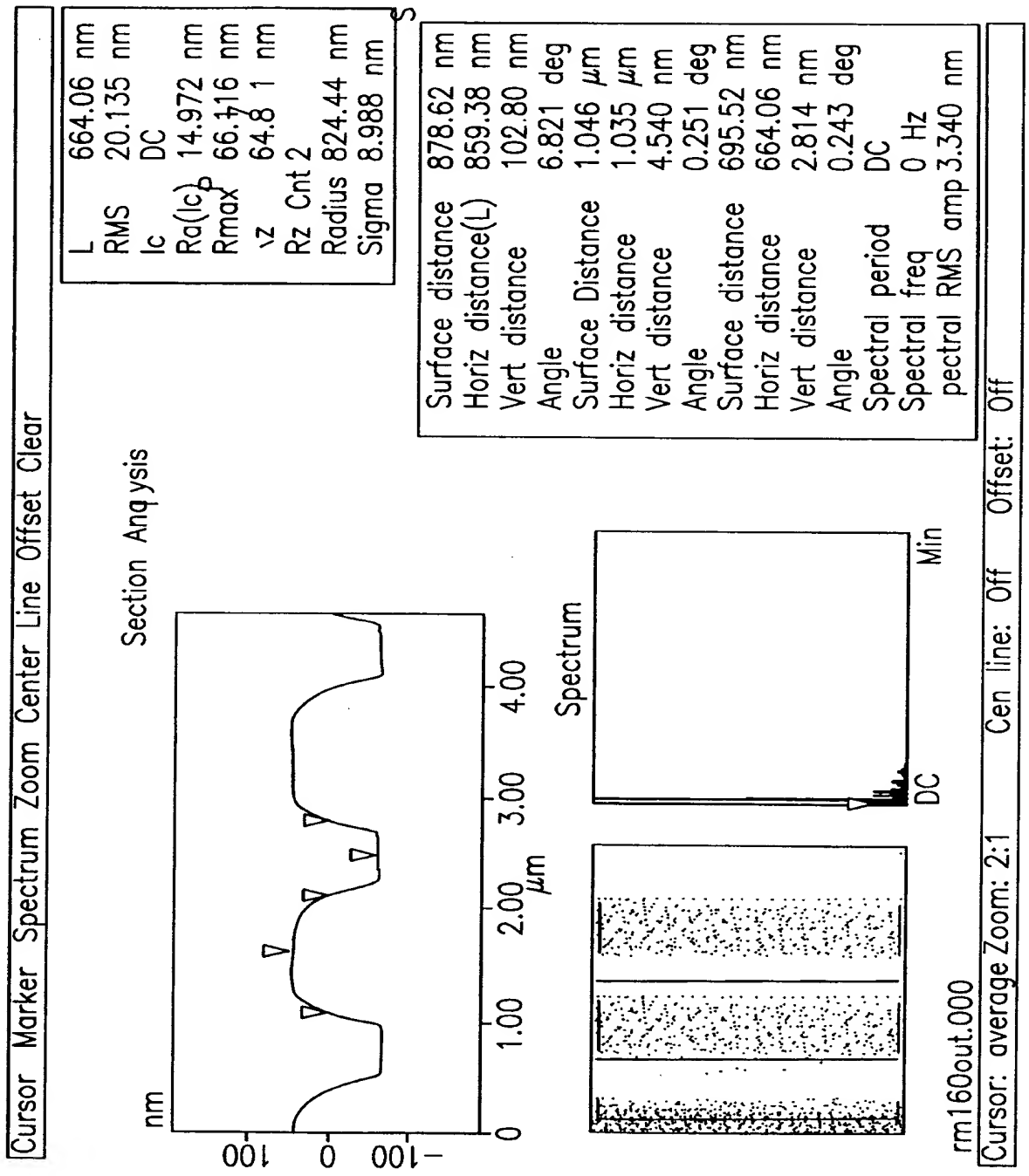

Cursor Marker Spectrum Zoom Center Line Offset Clear
Section Analysis
nm
100
0
-100
0
1.00
2.00
3.00
4.00
μm
Spectrum
L 683.59 nm
RMS 21.794 nm
lc DC
Ra(lc) 16.951 nm
Rmax 67.772 nm
Rz 66.682 nm
Rz Cnt 2
Radius 820.71 nm
Sigma 8.514 nm
Surface distance 956.26 nm
Horiz distance(L) 937.50 nm
Vert distance 107.52 nm
Angle 6.543 deg
Surface Distance 1.084 μm
Horiz distance 1.074 μm
Vert distance 7.648 μm
Angle 0.220 deg
Surface distance 715.65 nm
Horiz distance 683.59 nm
Vert distance 3.943 nm
Angle 0.330 deg
Spectral period DC
Spectral freq 0 Hz
Spectral RMS amp 3.603 nm
rm160in.000
Cursor: average Zoom: 2:1 Cen line: Off Offset: Off

FIG.33

FIG.34


Cursor Marker Spectrum Zoom Center Line Offset Clear
Section Anq ysis
nm
100
0
-100
0
1.00
2.00
3.00
4.00
μm
L 664.06 nm
RMS 20.135 nm
lc DC
Ra(lc) 14.972 nm
Rmax 66.116 nm
νz 64.8 1 nm
Rz Cnt 2
Radius 824.44 nm
Sigma 8.988 nm
Surface distance 878.62 nm
Horiz distance(L) 859.38 nm
Vert distance 102.80 nm
Angle 6.821 deg
Surface Distance 1.046 μm
Horiz distance 1.035 μm
Vert distance 4.540 nm
Angle 0.251 deg
Surface distance 695.52 nm
Horiz distance 664.06 nm
Vert distance 2.814 nm
Angle 0.243 deg
Spectral period DC
Spectral freq 0 Hz
pectral RMS amp 3.340 nm
Spectrum
DC
Min
rm160out.000
Cursor: average Zoom: 2:1 Cen line: Off Offset: Off

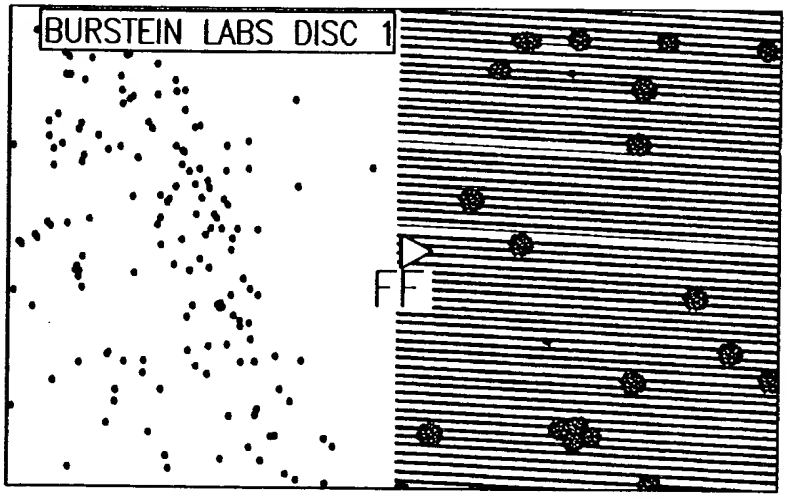


FIG.37A
20 femtomoles

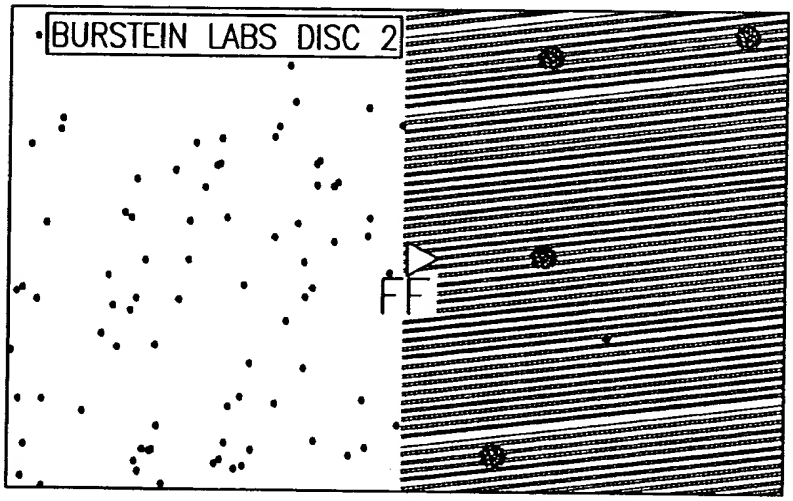


FIG.37B
20 attomoles

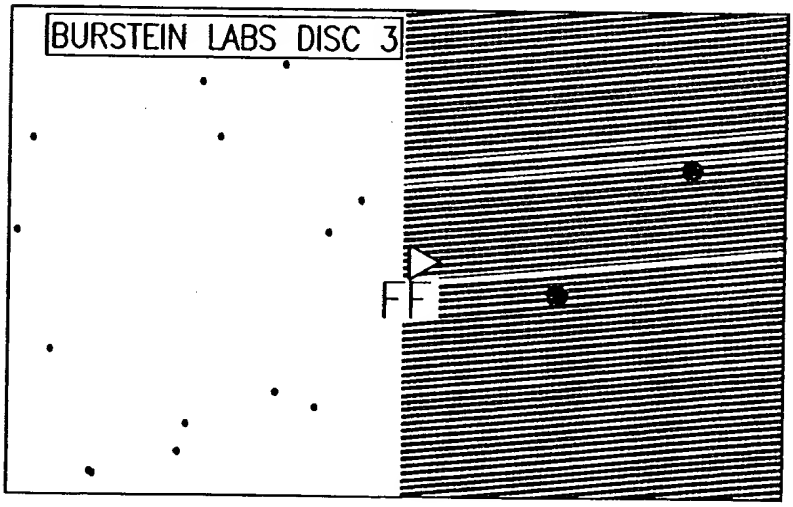


FIG.37C
20 zeptomoles

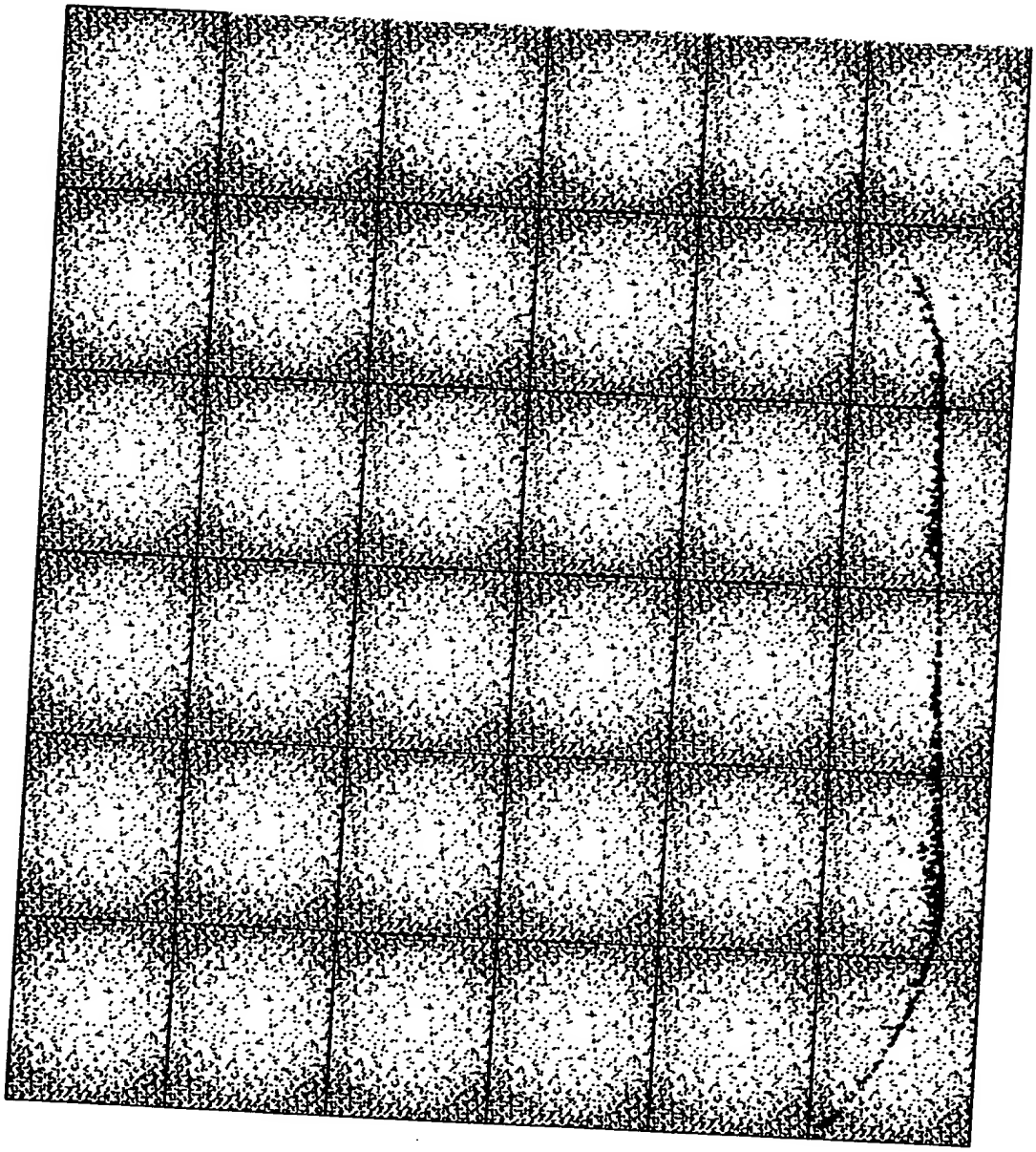


FIG.38

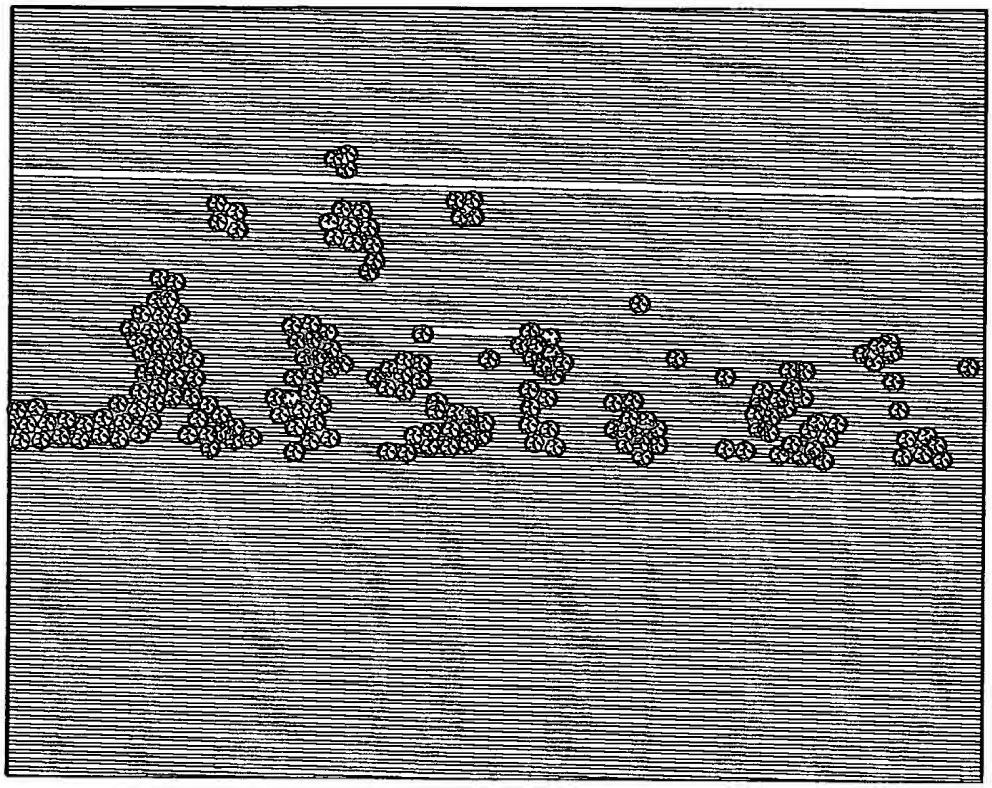


FIG.39

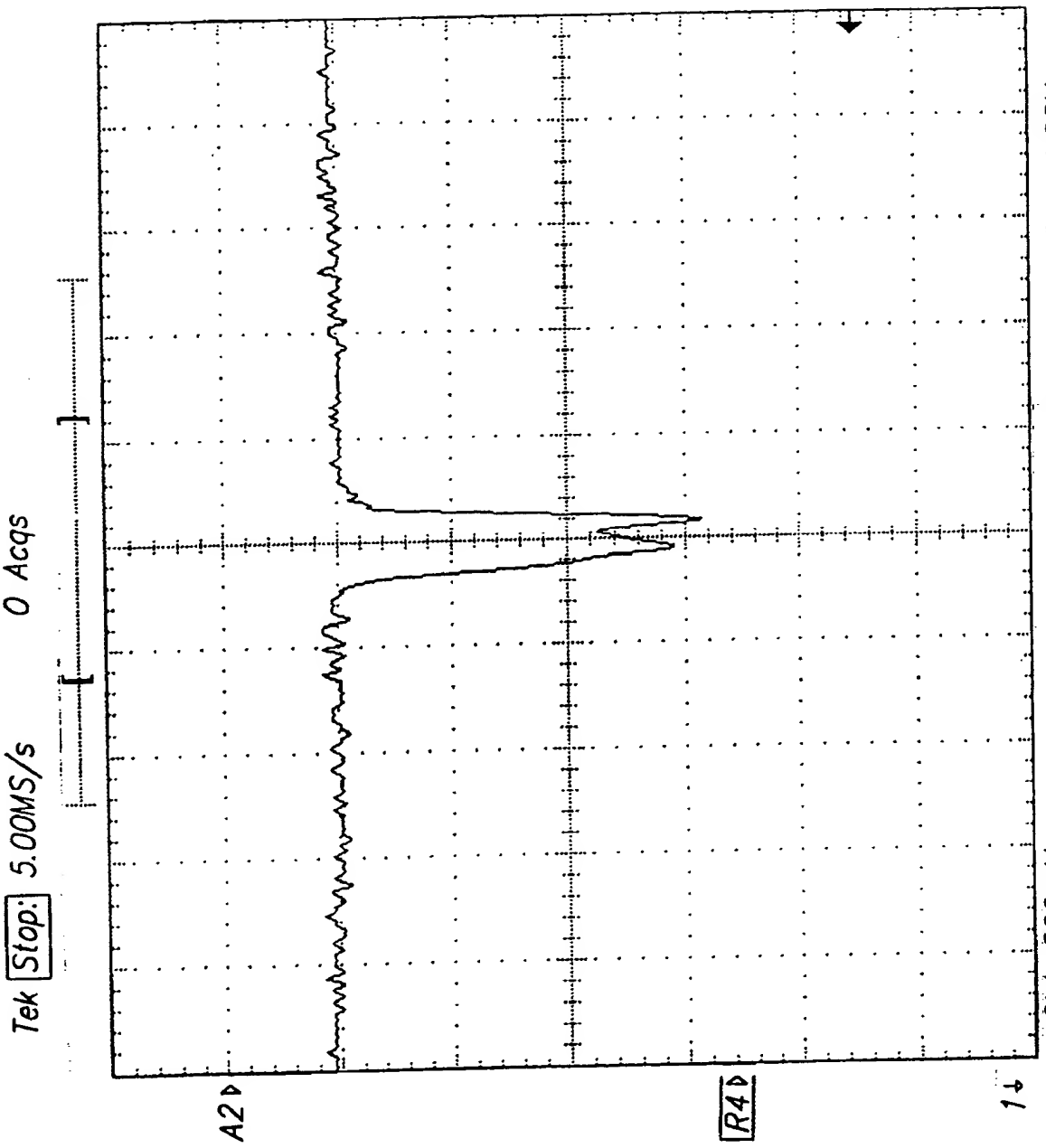

Tek Stop: 5.00MS/s 0 Acqs
M 10.0µs Ch1 ƒ 1.22V
Ch1 500mV
Ax2 500mV
500mV 10.0µs
Ref4
A2
R4
1

FIG. 13

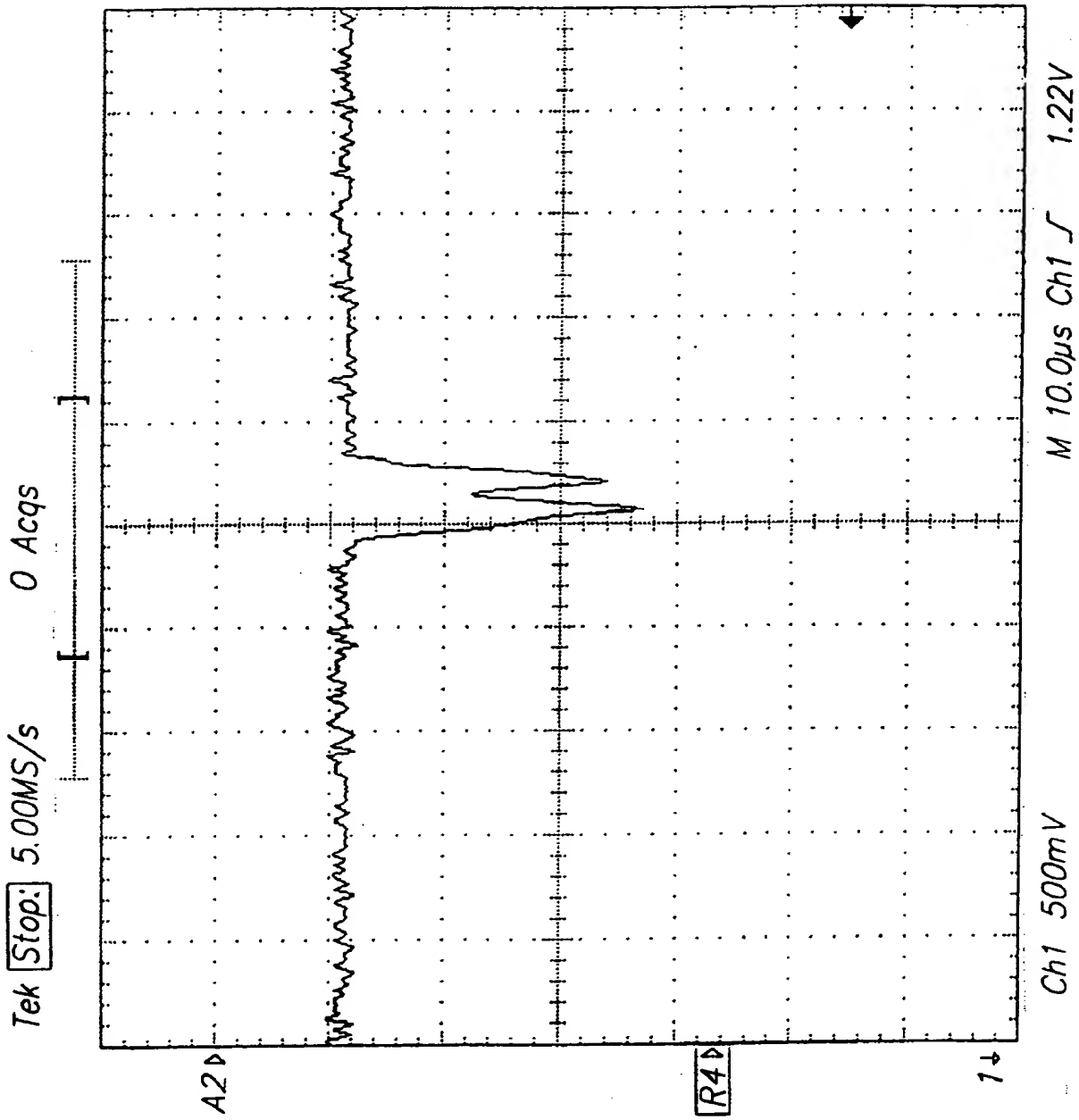

Tek Stop: 5.00MS/s 0 Acqs
M 10.0µs Ch1 ∫ 1.22V
Ch1 500mV
Ax2 500mV
Ref4 500mV 10.0µs
A2
R4
1

FIG. 14

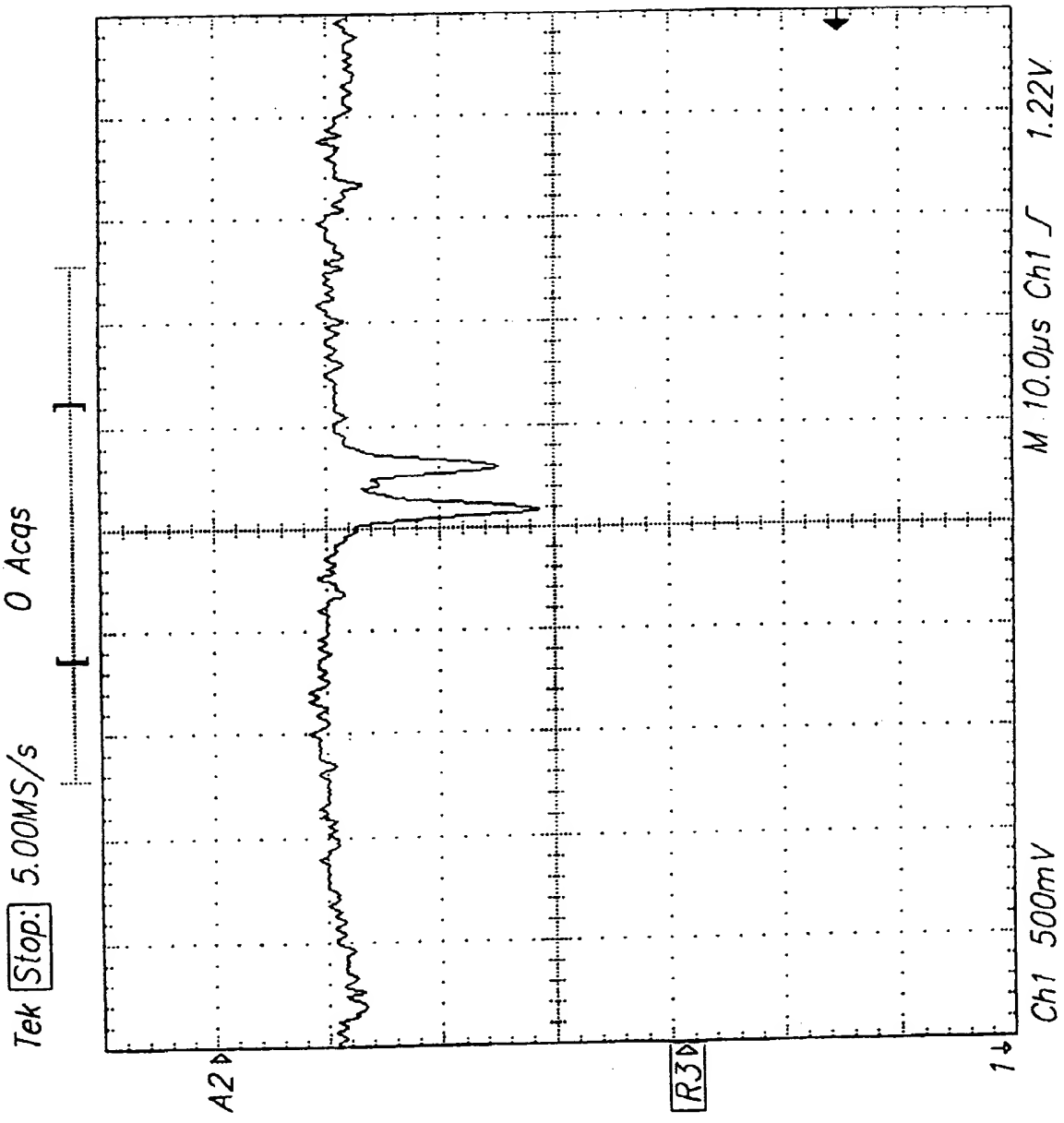

Tek Stop: 5.00MS/s 0 Acqs
M 10.0µs Ch1 ∫ 1.22V
Ch1 500mV
Ax2 500mV
Ref3 500mV 10.0µs
A2
R3
1

FIG. 15

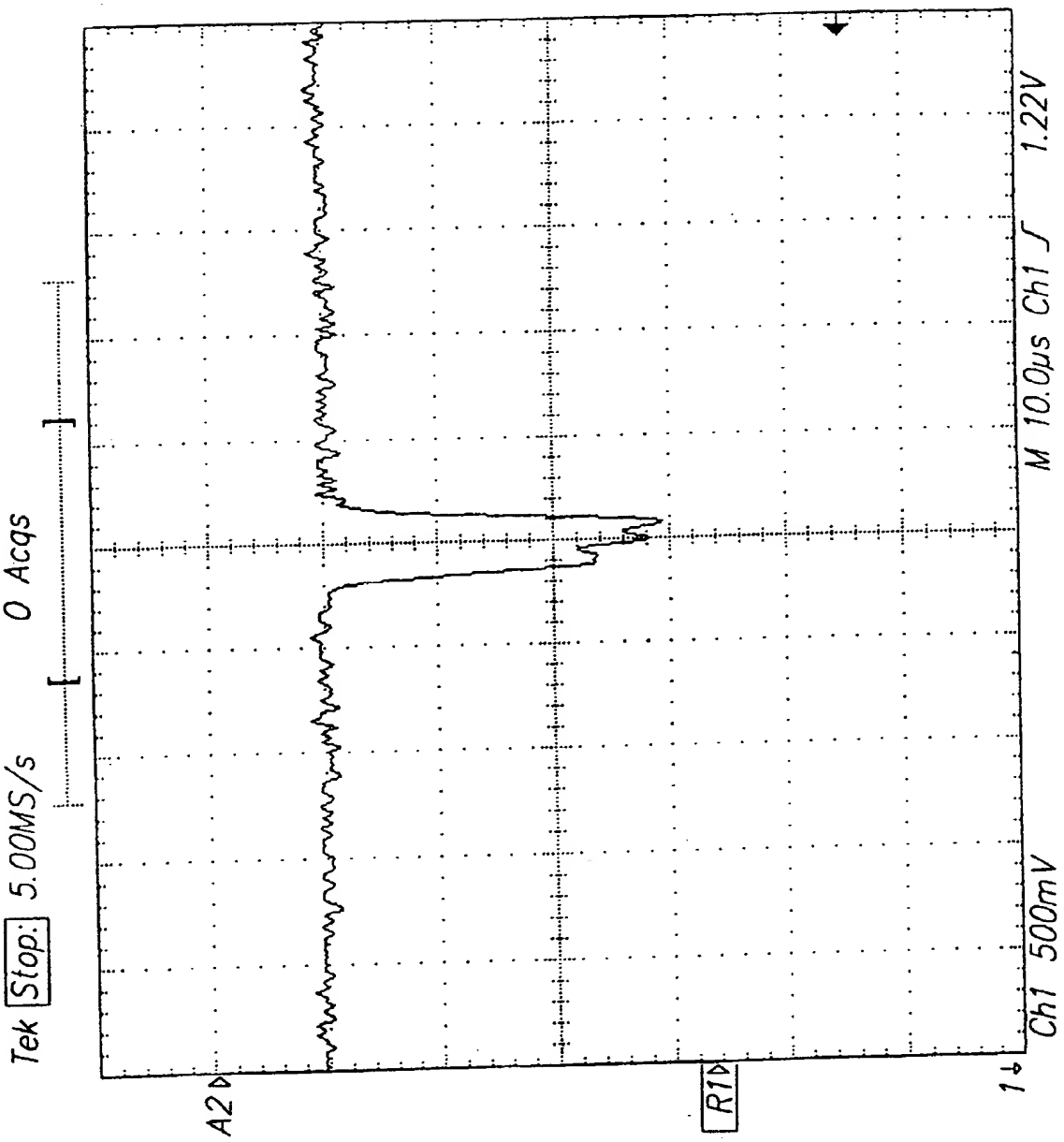

Tek Stop: 5.00MS/s 0 Acqs
A2
R1
1
Ch1 500mV
M 10.0µs Ch1 ∫ 1.22V
Ref1 500mV
Ax2 500mV
10.0µs

FIG. 16

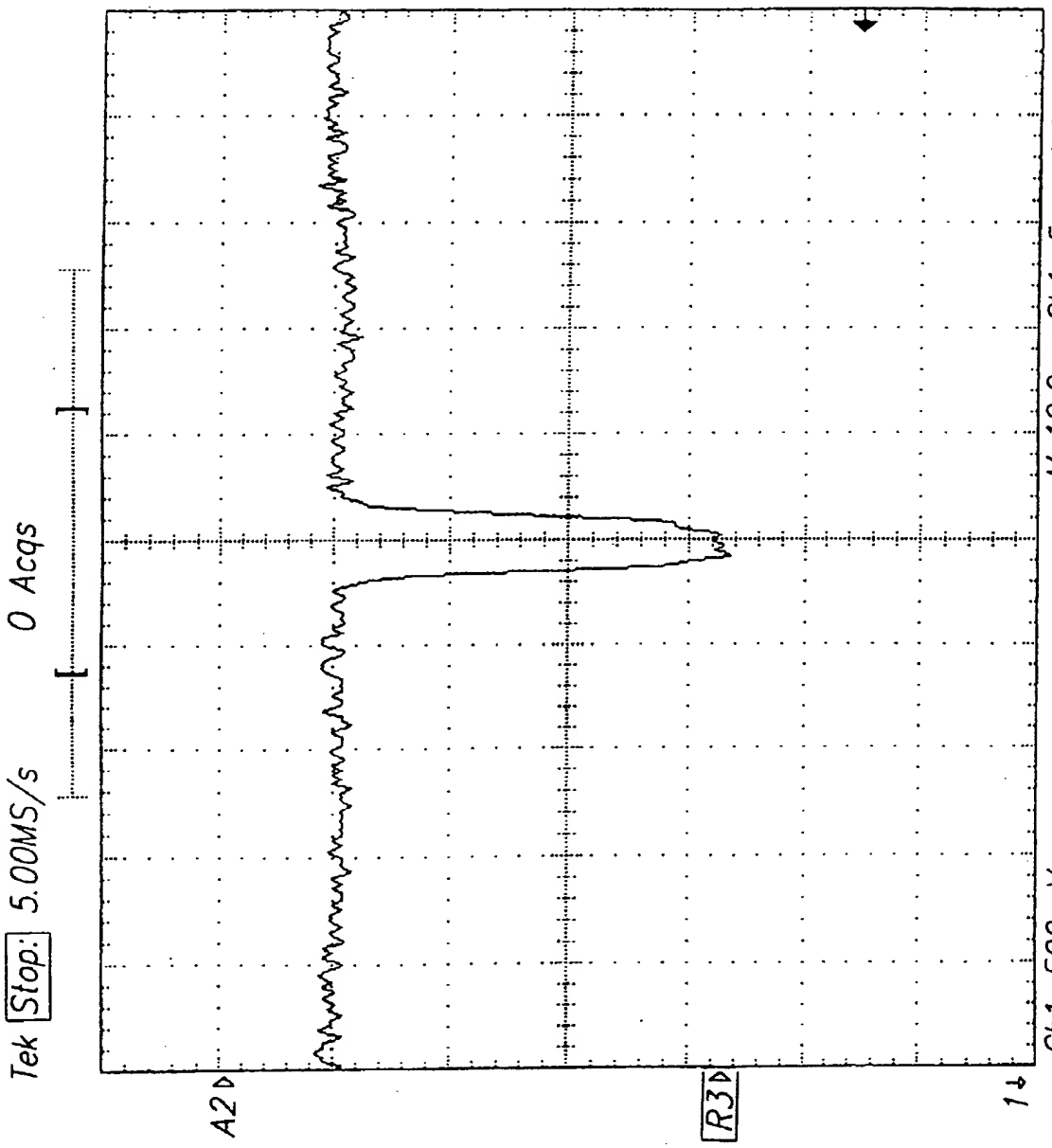

Tek Stop: 5.00MS/s 0 Acqs
A2
R3
1
Ch1 500mV
M 10.0µs Ch1 ∫ 1.22V
Ref3 .500mV
Ax2 500mV
10.0µs

FIG. 17

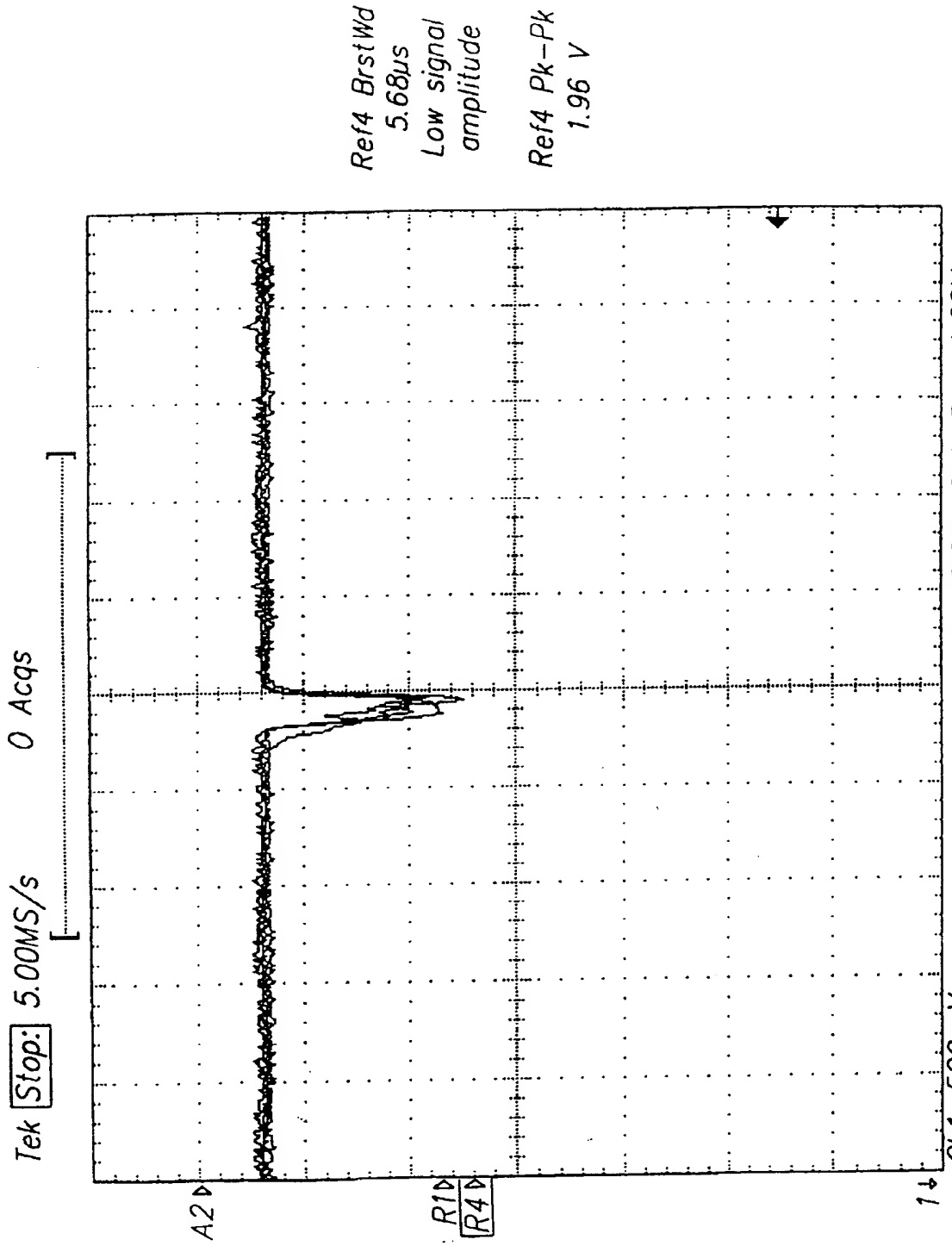

Ref4 BrstWd
5.68µs
Low signal
amplitude
Ref4 Pk-Pk
1.96 V
Tek Stop: 5.00MS/s 0 Acqs
M 10.0µs Ch1 ∫ 1.22V
Ch1 500mV
Ref4 1.00V Ax2 500mV 20.0µs
A2
R1
R4
1

FIG. 18

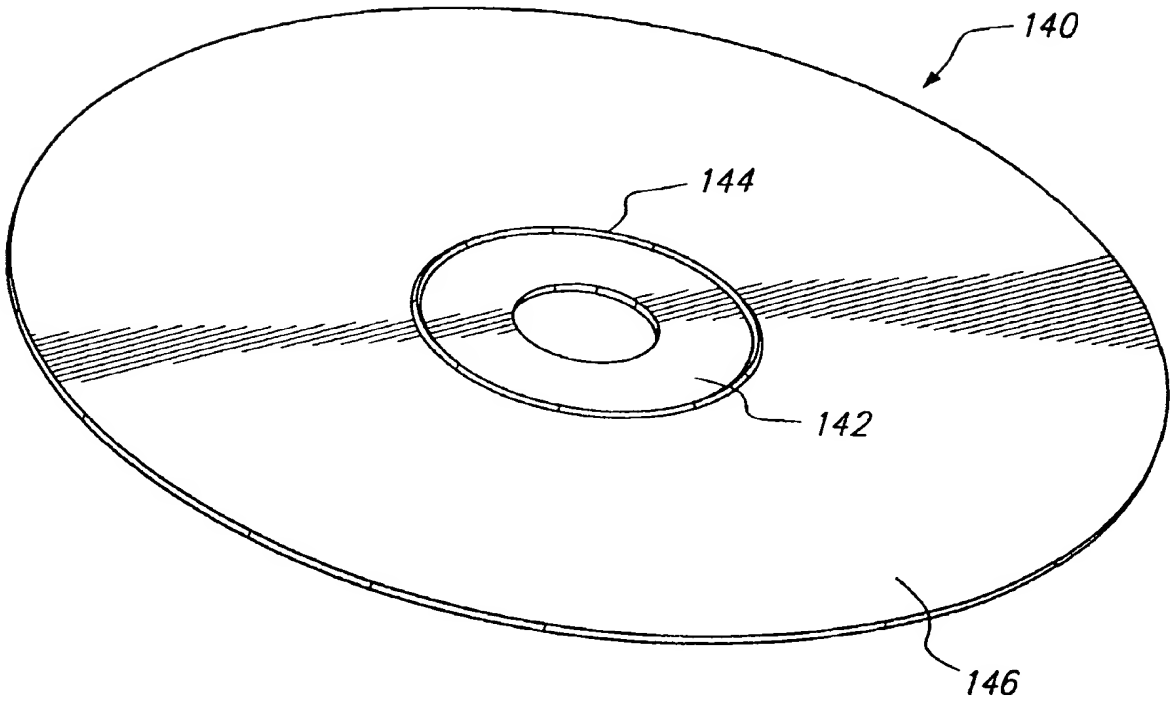


FIG. 35

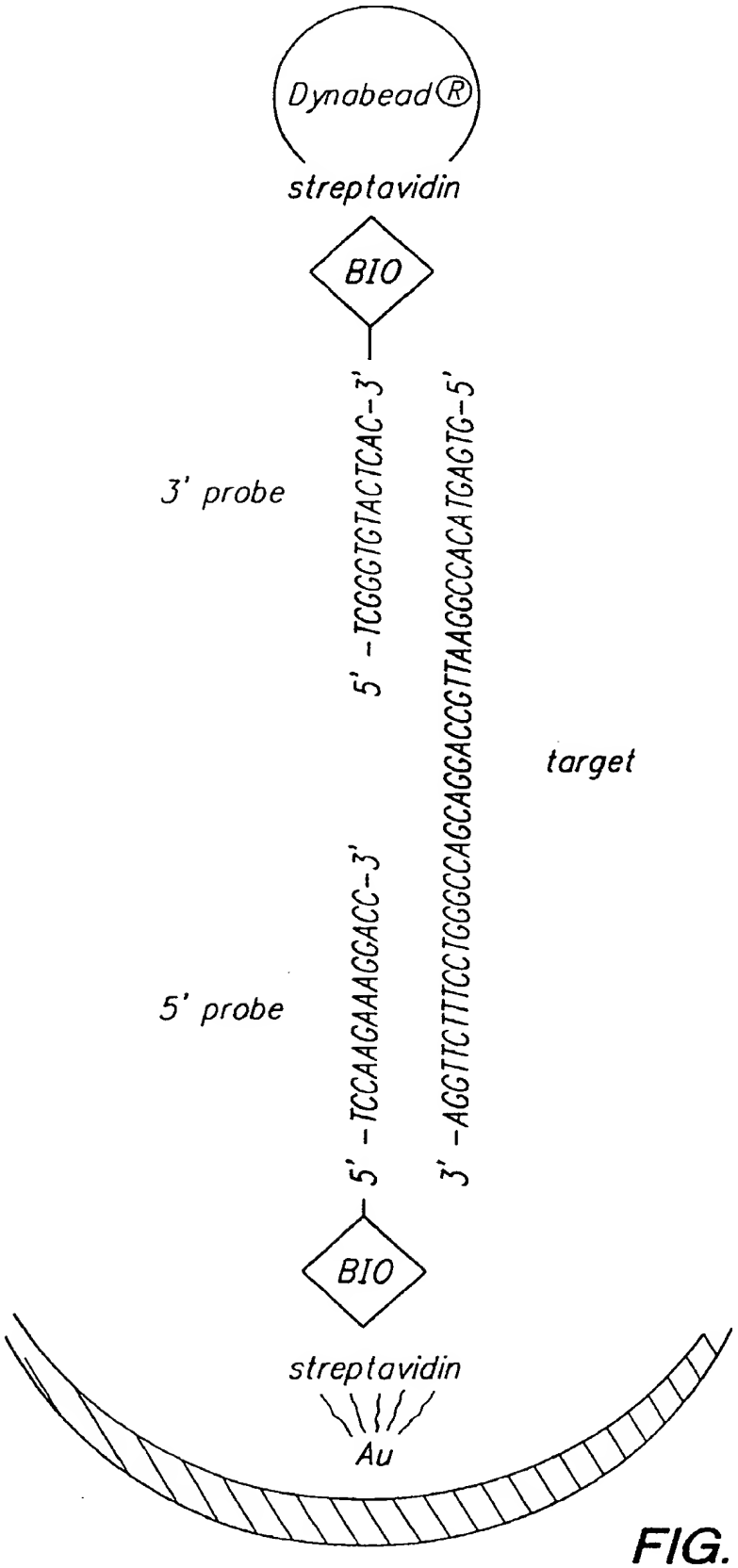

Dynabead®
streptavidin
BIO
3' probe
5' -TCGGCTGTACTCAC-3'
target
3' -AGGTTCTTTCCTGGGCCAGCAGGACCGTTAAGGCCACATGAGTG-5'
5' probe
5' -TCCAAGAAAGGACC-3'
BIO
streptavidin
Au

FIG. 36

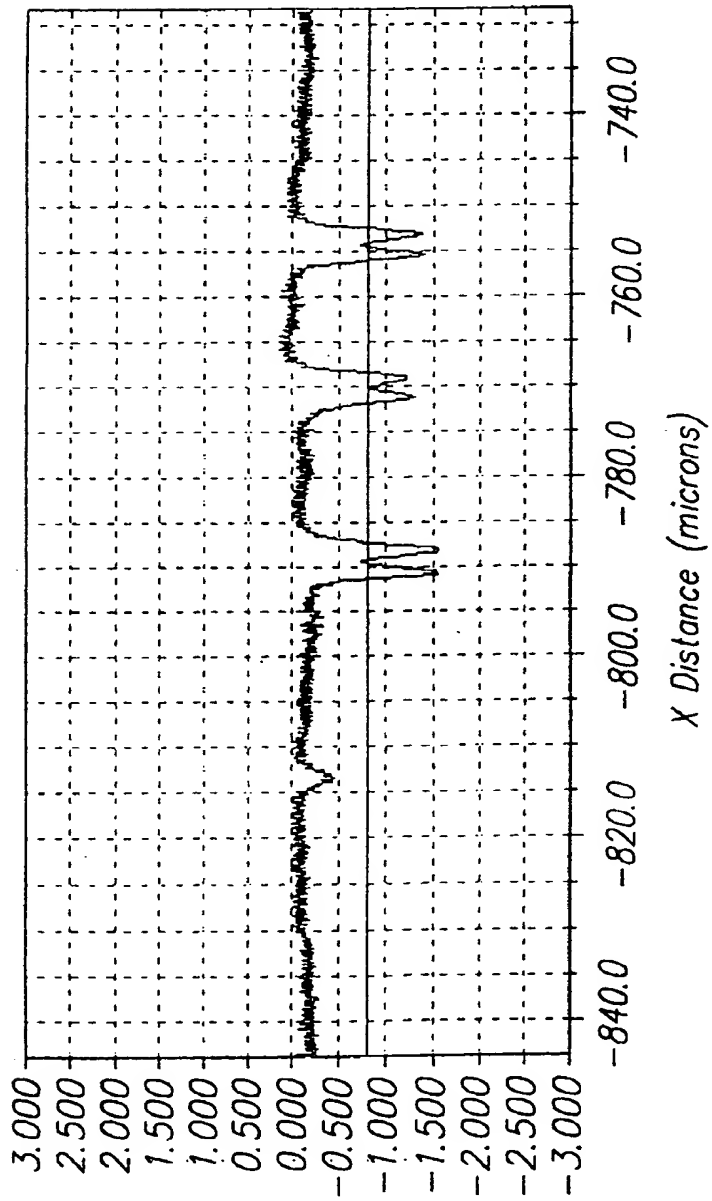

3.000
2.500
2.000
1.500
1.000
0.500
0.000
-0.500
-1.000
-1.500
-2.000
-2.500
-3.000
-840.0
-820.0
-800.0
-780.0
-760.0
-740.0
X Distance (microns)

FIG. 40

AWM Muri	Supplementary sheet, mold acceptance test				CD-3-AWM
Job No	36-10236	Agent	CR-R	Ram hold	vac + mech	IFPI	-
SM Order No	9N.96293	Customer	Eximpo CS	Ram dia.	24	Product Code No.	256

Dimensions		0°	90°	180°	270°	
0°=mold at top	R15	1.15	1.155	1.15	1.15	mm
Thickness	R40	1.155	1.155	1.155	1.155	mm

Center hole 15.05+/-0.3 15.05 Drm. 120+/-0.3 mm

Weight in g	Min	0	15	30	45	60
Measure every 15 min.	g	15.26	15.27	15.26	15.26	15.26
during test	g		15.26	15.26	15.26	15.26

Max. diff±0.1 g

Water in mold	ACTUAL		DESIRED	Tol.
Sprue bush	9	ltr./Min.	7	-1/+3
Embosser	6	ltr./MIN.	7	-1/+3

Vacuum		without	with	diff.	tol.
Handling	bar				
Ram	bar				

Mold Function	
Embosser	✓
Sprue ejector	✓
Ejector sleeve	✓
Sprue bush	✓

Air outlet	
FS dia.	✓
BS dia.	✓

Raw material
Makrolon 2005 ✓
Lexan 1020
Panlite 5503

Visual faults			
Streaks	1/4	Center hole	✓
	1/4	Stacking groove	✓
	1/4	Info	✓
Clouds	1/2		✓
Voids	1		✓
Black dots	3		✓
Matt outer edge	3		✓
Burrs	3		✓
	3	Center hole	✓
	3	Outer Edge	✓
Scratches	3		✓
Diesel effect	3		✓
Brown Discoloration	5		✓

Molding compound cold	
Thickness of cavity (3)	1.462
Venting gap (5)	0.33
Position of embosser (9)	0.876
Position of spure bush (10)	0.162
Embossing stroke	0.7

Measuring means	
Polarized light	1
Halogen light	2
Neon Light	3
Black (UV Light)	4
White paper	5
Micrometer	6
Balance	7

FIG. 41A

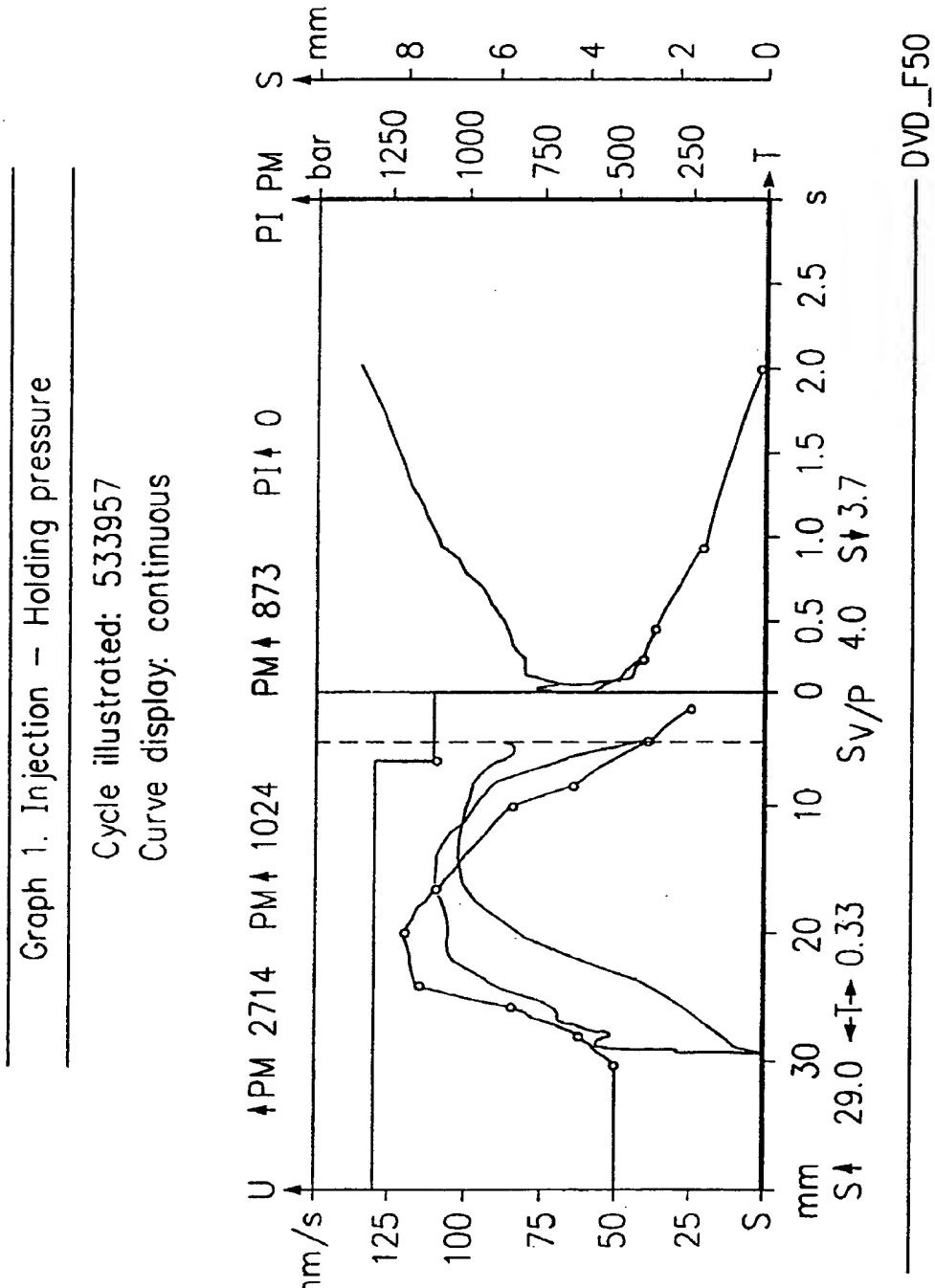

Graph 1. Injection – Holding pressure
Cycle illustrated: 533957
Curve display: continuous
U
mm/s
125
100
75
50
25
S
PM 2714 PM 1024
PM 873
PI 0
PI PM
bar
1250
1000
750
500
250
T
S
mm
8
6
4
2
0
mm
S 29.0 T 0.33
30
20
10
0
0.5
1.0
1.5
2.0
2.5
s
Sv/P 4.0 S 3.7
DVD_F50

FIG. 41B

01.01 Mold movement					
Closing movement		Closing time	T32	=	000.
	V33 =100%	S33 = 019.0mm			
Pressure initiation	V34 =100%	S34 = 000.7mm			
Opening movement		Opening time	T36	=	000.
	V41 =100%	S41 = 055.0mm			
Braking	V42 =010%				
Pause time	T40 =000.000s	Mold position	S640	=	075.
Mold closing pressures					
Closing pressure	P682 =085%				
Pressure Build-up	P681 =020%	T681 = 000.10s			
	C608 = 0	Switched off			
02.01 Summary of mold auxiliary controls/robotics					
Enable removal	T680 = 0065.0				
Delays					
Blow off sprue	T602 = 000.03	Sprue blowing time	T603	=	000.1
Advance ejector pin	T53 = 000.10s				
Transfer stroke forward	T55 = 000.12s				
Transfer Stroke return	T56 = 000.15s	Extend removal	T668	=	000.2
Embosser forward	T62 = 001.20s	Embosser return	T63	=	000.1
Blow on nozzle side	T75 = 000.50s	Nozzle side blowing time	T74	=	000.8
Blow on moving side	T671 = 000.00	Moving side blowing time	T71	=	000.1
Unit Forward	T680 = 000.70s				
Starting program	C683 = 00000	T683 = 000.00s	S683	=	0004.
Cyle time	T11 = 009.05s				
Removal time	T640 = 000.70s				

FIG. 41C

03.01 Metering							
Screw retraction	C17 = 0	Switched off					
Metering Delay	T20 = 000.50 s	Metering time	T21 = 005.9				
Metering stages	C124 = 2						
	S23 = 026.0 mm	P23 = 0060 bar		N23 = 100 1.			
Metering end point	S24 = 029.0 mm	P24 = 0010 bar		N24 = 020 1.			
Holding pressure	P27 = 0010 bar	Start of injection		S0 = 029.0			

04.01 Injection							
Enable injection	S682 = 0002.0 mm	Screw position	S641 = 029.0				
Injection values	C121 = 10	Start of injection	S0 = 029.0				
	V196 = 0050 mm/s	S196 = 030.0 mm					
	V197 = 0062 mm/s	S197 = 027.6 mm					
	V198 = 0085 mm/s	S198 = 025.6 mm					
	V199 = 0115 mm/s	S199 = 024.0 mm					
	V200 = 0120 mm/s	S200 = 019.8 mm					
	V201 = 0110 mm/s	S201 = 016.2 mm					
	V202 = 0085 mm/s	S202 = 009.5 mm					
	V203 = 0065 mm/s	S203 = 008.0 mm					
Enable V/P changeover	V204 = 0040 mm/s	S204 = 004.0 mm					
Forcible changeover	V205 = 0025 mm/s	S205 = 001.5 mm	T2 = 000.3				
		V/P changeover point	S11 = 004.0				
Flow number	S121 = 018.2 mm	S122 = 015.0 mm	C125 = 2776				
Pressure monitoring		Peak pressure	P125 = 01044				
First stage	P101 = 01300 bar	T201 = 00.02 s					
Second stage	P102 = 01100 bar	T201 = 00.02 s	S102 = 006.0				

FIG. 41D

04.02 Holding pressure, cooling									
Holding pressure values	C122	=	04	Changeover point			S11	=	004.0
	P12	=	00550 bar						
	P117	=	00420 bar	T117	=	000.20			
	P118	=	00380 bar	T118	=	000.40			
	P119	=	00200 bar	T119	=	000.90			
Holding pressure time				T120	=	002.00			
Cooling time	T39	=	005.30 s						
Melt cushion monitoring				Melt cushion			S19	=	003.7
Upper limit	S219	=	010.0 MM	Lower limit			S119	=	000.5

05.01 Nozzles, unit, purging/dry cycles									
Standstill monitoring	C606	=	60 min	C640	=	0004 min			
Unit									
Unit forward	T680	=	000.70 s	V29	=	030 %			
Lift	T30	=	000.30 s	V30	=	050 %			
Unit set-up and manual movements									
Move forward	V816	=	030 %	Lift	V806	= 030 %			
Purge/dry cycle/clean									
Number of metering strokes	C16	=	20	C201	=	50			
Metering	S16	=	028.0 mm	P16	=	0060 bar	N16	=	200
Injection	S18	=	001.5 mm	V101	=	05 mm/s			
Delay for purging	T606	=	000.00 s						

FIG. 41E

06.01 Temperature control, plastifier zones/temperature control devices

Zone/description	Set point	Actual value	Reduced	Tolerance minus	Tolerance plus	Heating outputs	Cooling
10 Melt temperature	310° C	305° C	180° C	040° C	040° C		
30 Nozzle	330° C	330° C	180° C		040° C	014%	
13 Nozzle	315° C	315° C	180° C	040° C	040° C	025%	
Cylinder head	310° C	310° C	180° C	040° C	040° C	008%	
15 Compression	305° C	305° C	180° C	040° C	040° C	005%	
16 Compression	305° C	308° C	180° C	040° C	040° C	006%	
18 Feed	300° C	295° C	180° C	040° C	040° C	070%	
20 Inlet	060° C	060° C	060° C	040° C	040° C		024

Zone/description	Set point	Actual value	Reduced	Tolerance minus	Tolerance plus	Heating outputs	Cooling
24 Heating/cooling device	112° C	093° C	050° C	020° C	020° C	000%	000
25 Heating/cooling device	114° C	091° C	050° C	040° C	020° C	000%	000

08.01 Disk transfer

Peripheral interface	C684	=	0	Without signal acknowledgement		
Buffer switch-off size	C680	=	65000			
Production delay	T682	=	001.00 s	C605	=	0 With interruption of cycle
Max. transfer time	T601	=	001.00 s			

FIG. 41F

09.01 Production control

Application	C340	= 2	No application			
Data set number	C315	= 100				
Production sequence						
			Piece counter	C324	=	29270
Item number	C303	= 1	Cycle counter	C325	=	29270
Cycle time	T11	= 009.05 s	Failure rate	C718	=	30.56%
Production preperation			Reason	C357	=	00

10.01 Process statistics

Q monitoring	C340 = 2	Monitoring without screenning out		
Q report	C700 = 0	No report		
	cycles of which	out of tolerance	failure rate	
Total	C325 = 29270	C318 = 8946	C718 = 30.56%	
Random sample	C326 = 29269	C338 = 8946	C738 = 30.56%	

Process variables	Set Point x	Tolerance +/-	Actual Value x	Mean xq	Scatter 3s	Out of Tolerance
Metering time	1.20	0.30	5.98 s	2.32	5.408	-06786
Injection start	30.1	2.0	29.0 mm	28.6	0.82	2028
Injection time	0.47	0.20	0.33s	0.39	0.105	0
V/P changeover point	3.5	1.0	4.0 mm	4.0	0.04	0
Melt cushion	4.2	1.0	3.7 mm	3.8	0.25	0
? peak value	600	200	871 bar	682	99.9	-06566
? peak value	0		0 bar	0	0.0	
Flow number	2500	300	2776	2441	99.9	359
Cycle time	3.90	0.50	9.05 s	5.08	6.421	-06570

FIG. 41G

10.02 Configuration of the quality monitoring

Reaction: Process data outside tolerance
Switch-off behavior C703=0 no reaction

10.03 Q report intermediate store

Manufacturer
Machine No. DVD_F50

Job data

FIG. 41H

16.01 System characteristics

Machine data			
Machine type	DISCJET 600/110	Order number	DVD_F50
Control version	PAC 13.54	IMC 12.26	CEL 10.31
Database version	DB 05.80	Date created	23.10.1996
Special	350400	Version	17106

Mold data
Installed height S90 = 160 mm

Plasticizing	Identification	C806 = 024			C804 = 00?
Ram nominal diameter	S801	= 032.0 mm	Max metering stroke		S802 = 100.-
Max. permissible melt pressure	PB00=01482 bar		Max. specific melt pressure		P802 = 01482 bar
Max. permissible backpressure	P801	= 0317 bar			

Temperatures	Set point/actual value	Tolerance −/+		Heating	Cooling
Cabinet	TH1 = 035 026° C	030° C	010° C		
Oil	TH2 = 050 051° C	041° C	011° C	000%	005

FIG. 41I